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OF COUNSEL

PAUL SYNNESTVEDT (1897-1950)  
HARVEY LECHNER (1909-1954)



SYNNESTVEDT & LECHNER LLP

*Intellectual Property Law*

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PATENT AGENTS

COZETTE M. McAVOY  
SCIENTIFIC ADVISOR

\*ADMITTED ONLY IN NJ

March 8, 2005

Denise M. Porreca  
215-717-2266  
[Dporreca@synnlech.com](mailto:Dporreca@synnlech.com)

**VIA HAND DELIVERY**

Mr. Michael E. Kunz  
Clerk of Court  
U. S. District Court for the Eastern District of PA  
U.S. Courthouse  
601 Market Street, Room 2609  
Philadelphia, PA 19106-1797

RE: COMAPER CORPORATION v. ANTEC, INC., et al.  
S&L File No. G24,373

Dear Mr. Kunz:

Enclosed for filing please find the following documents:

- (1) Complaint;
- (2) Summons;
- (3) Civil Cover Sheet;
- (4) Designation Form;
- (5) Case Management Track Designation Form;
- (6) Diskette; and
- (7) Check (\$150.00)

Also enclosed please find a copy of above for date-stamp with a self-addressed, postage-prepaid envelope for return of same.

Thank you for your attention to this matter.

Very truly yours,

A handwritten signature in cursive script that reads 'Denise M. Porreca'.  
Denise M. Porreca  
Paralegal

/dmp  
Enclosures

## CIVIL COVER SHEET

The JS-44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON THE REVERSE OF THE FORM.)

**I (a) PLAINTIFFS****COMAPER CORPORATION**

256 West Fifth Avenue  
Collegeville, PA 19426

**(b) COUNTY OF RESIDENCE OF FIRST LISTED PLAINTIFF**

(EXCEPT IN U.S. PLAINTIFF CASES) MONTGOMERY

**DEFENDANTS****ANTEC, INC.**

47900 Fremont Blvd, Fremont, CA 94538

**BEST BUY CO., INC.**

7601 Penn Ave., South, Richfield MN 55423

**MICRO ELECTRONICS, INC.**

4119 Leap Road, Hilliard, OH 43026

COUNTY OF RESIDENCE OF FIRST LISTED DEFENDANT ALAMEDA  
(IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED

**(c) ATTORNEYS (FIRM NAME, ADDRESS, AND TELEPHONE NUMBER)**

Joseph F. Posillico, Esquire  
Stephen J. Driscoll, Esquire  
Synnestvedt & Lechner, LLP  
2600 ARAMARK Tower, 1101 Market Street  
Philadelphia, PA 19107-2950  
(215) 923-4466

**ATTORNEYS (IF KNOWN)****II. BASIS OF JURISDICTION**

(PLACE AN X IN ONE BOX ONLY)

- ☐ 1 U.S., Government Plaintiff
- ☒ 3 U.S. Government Defendant
- ☒ 3 Federal Question (U.S. Government Not a Party)
- ☐ 4 Diversity (Indicate Citizenship of Parties in Item III)

**III. CITIZENSHIP OF PRINCIPAL PARTIES**

(PLACE AN X IN ONE BOX FOR PLAINTIFF AND ONE BOX FOR DEFENDANT)

(For Diversity Cases Only)

Citizen of This State ☐ 1 ☐ 1

Citizen of Another State ☐ 2 ☐ 2

Citizen or Subject of a Foreign Country ☐ 3 ☐ 3

Incorporated or Principal Place of Business in This State ☐ 4 ☐ 4

Incorporated and Principal Place of Business in Another State ☐ 5 ☐ 5

Foreign Nation ☐ 6 ☐ 6

**IV. CAUSE OF ACTION**

(CITE THE U.S. CIVIL STATUTE UNDER WHICH YOU ARE FILING AND WRITE A BRIEF STATEMENT OF CAUSE. DO NOT CITE JURISDICTIONAL STATUTES UNLESS DIVERSITY) PATENT INFRINGEMENT 35 U.S.C. §§ 271 and 281

**V. NATURE OF SUIT (PLACE AN X IN ONE BOX ONLY)**

CONTRACT	TORTS		FORFEITURE/PENALTY	BANKRUPTCY	OTHER STATUTES
<input type="checkbox"/> 110 Insurance <input type="checkbox"/> 120 Marine <input type="checkbox"/> 130 Miller Act <input type="checkbox"/> 140 Negotiable Instrument <input type="checkbox"/> 150 Recovery of Overpayment & Enforcement of Judgment <input type="checkbox"/> 151 Medicare Act <input type="checkbox"/> 152 Recovery of Defaulted Student Loans (Excl. Veterans) <input type="checkbox"/> 153 Recovery of Overpayment Of Veteran's Benefits <input type="checkbox"/> 160 Stockholders' Suits <input checked="" type="checkbox"/> 190 Other Contract <input type="checkbox"/> 195 Contract Product Liability	<b>PERSONAL INJURY</b> <input type="checkbox"/> 310 Airplane <input type="checkbox"/> 315 Airplane Product Liability <input type="checkbox"/> 320 Assault, Libel & Slander <input type="checkbox"/> 330 Federal Employers' Liability <input type="checkbox"/> 340 Marine <input type="checkbox"/> 345 Marine Product Liability <input type="checkbox"/> 350 Motor Vehicle <input type="checkbox"/> 355 Motor Vehicle Product Liability <input type="checkbox"/> 360 Other Personal Injury	<b>PERSONAL INJURY</b> <input type="checkbox"/> 362 Personal Injury - Med. Malpractice <input type="checkbox"/> 365 Personal Injury - Product Liability <input type="checkbox"/> 368 Asbestos Personal Injury Product Liability <b>PERSONAL PROPERTY</b> <input type="checkbox"/> 370 Other Fraud <input type="checkbox"/> 371 Truth in Lending <input type="checkbox"/> 380 Other Personal Property Damage <input type="checkbox"/> 385 Property Damage Product Liability	<input type="checkbox"/> 610 Agriculture <input type="checkbox"/> 620 Other Food & Drug <input type="checkbox"/> 625 Drug Related Seizure of Property 21 USC 881 <input type="checkbox"/> 630 Liquor Laws <input type="checkbox"/> 640 R R & Truck <input type="checkbox"/> 650 Airline Regs <input type="checkbox"/> 660 Occupational Safety/Health <input type="checkbox"/> 690 Other <b>LABOR</b> <input type="checkbox"/> 710 Fair Labor Standards Act <input type="checkbox"/> 720 Labor/Mgmt. Relations <input type="checkbox"/> 730 Labor/Mgmt. Reporting & Disclosure Act <input type="checkbox"/> 740 Railway Labor Act <input type="checkbox"/> 790 Other Labor Litigation <input type="checkbox"/> 791 Empl. Rel. Inc. Security Act	<input type="checkbox"/> 422 Appeal 28 USC 158 <input type="checkbox"/> 423 Withdrawal 28 USC 157 <b>PROPERTY RIGHTS</b> <input type="checkbox"/> 820 Copyrights <input checked="" type="checkbox"/> 830 Patent <input type="checkbox"/> 840 Trademark <b>SOCIAL SECURITY</b> <input type="checkbox"/> 861 HIA (1395FF) <input type="checkbox"/> 862 Black Lung (923) <input type="checkbox"/> 863 DIWC/DIWW (405(g)) <input type="checkbox"/> 864 SSID Title XVI <input type="checkbox"/> 865 RSI (405(g)) <b>FEDERAL TAX SUITS</b> <input type="checkbox"/> 870 Taxes (U.S. Plaintiff Or Defendant) <input type="checkbox"/> 871 IRS - Third Party 26 USC 7609	<input type="checkbox"/> 400 State Reappointment <input type="checkbox"/> 410 Antitrust <input type="checkbox"/> 430 Banks and Banking <input type="checkbox"/> 450 Commerce/ICC Rates/etc. <input type="checkbox"/> 460 Deportation <input type="checkbox"/> 470 Racketeer Influenced and Corrupt Organizations <input type="checkbox"/> 810 Selective Service <input type="checkbox"/> 850 Securities/Commodities/Exchange <input type="checkbox"/> 875 Customer Challenge 12 USC 3410 <input type="checkbox"/> 891 Agricultural Act <input type="checkbox"/> 892 Economic Stabilization Act <input type="checkbox"/> 893 Environmental Matters <input type="checkbox"/> 894 Energy Allocation Act <input type="checkbox"/> 895 Freedom of Information Act <input type="checkbox"/> 900 Appeal of Fee Determination Under Equal Access to Justice <input type="checkbox"/> 950 Constitutionality of State Statutes <input type="checkbox"/> 890 Other Statutory Actions
<b>REAL PROPERTY</b> <input type="checkbox"/> 210 Land Condemnation <input type="checkbox"/> 220 Foreclosure <input type="checkbox"/> 230 Rent Lease & Ejectment <input type="checkbox"/> 240 Torts to Land <input type="checkbox"/> 245 Tort Product Liability <input type="checkbox"/> 290 All Other Real Property	<b>CIVIL RIGHTS</b> <input type="checkbox"/> 441 Voting <input type="checkbox"/> 442 Employment <input type="checkbox"/> 443 Housing/Accommodations <input type="checkbox"/> 444 Welfare <input type="checkbox"/> 440 Other Civil Rights	<b>PRISONER PETITIONS</b> <input type="checkbox"/> 510 Motions to Vacate Sentence <input type="checkbox"/> 515 Habeas Corpus <input type="checkbox"/> 530 General <input type="checkbox"/> 535 Death Penalty <input type="checkbox"/> 540 Mandamus & Other <input type="checkbox"/> 550 Other			

**VI. ORIGIN**

(PLACE AN X IN ONE BOX ONLY)

☒ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 another district (specify) ☐ 6 Multidistrict Litigation ☐ 7 Appeal to District Judge from Magistrate Judgment

**VII. REQUESTED IN COMPLAINT**

CHECK IF THIS IS A CLASS ACTION

DEMAND \$

Check YES only if demanded in complaint:

JURY DEMAND: ☒ YES ☐ NO**VIII. RELATED CASE(S) IF ANY**

(See instructions):

DATE

SIGNATURE OF ATTORNEY OF RECORD

JUDGE

DOCKET NUMBER

JOSEPH F. POSILLICO or STEPHEN J. DRISCOLL

**SUMMONS IN A CIVIL ACTION**

## UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF PENNSYLVANIA

COMAPER CORPORATION

Plaintiff

vs.

ANTEC, INC.  
 BEST BUY CO., INC.  
 MICRO ELECTRONICS, INC. and  
 DOES 1-20, inclusive

Defendants.

CIVIL ACTION NO.

TO: (NAME AND ADDRESS OF DEFENDANT)

ANTEC, INC.  
 47900 Fremont Boulevard  
 Fremont, CA 94538

**YOU ARE HEREBY SUMMONED** and required to serve upon

Plaintiff's Attorney (Name and Address)

Joseph F. Posillico  
 Stephen J. Driscoll  
 Synnestvedt & Lechner, LLP  
 2600 Aramark Tower  
 1101 Market Street  
 Philadelphia, PA 19107-2950

an answer to the complaint which is herewith served upon you, within 20 days after service of this summons upon you, exclusive of the date of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the complaint.

Michael E. Kunz, Clerk of Court

Date:

(By) Deputy Clerk

**SUMMONS IN A CIVIL ACTION**

## UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF PENNSYLVANIA

COMAPER CORPORATION

Plaintiff

vs.

ANTEC, INC.  
 BEST BUY CO., INC.  
 MICRO ELECTRONICS, INC. and  
 DOES 1-20, inclusive

Defendants.

CIVIL ACTION NO.

TO: (NAME AND ADDRESS OF DEFENDANT)

BEST BUY CO., INC.  
 7601 Penn Avenue South  
 Richfield, MN 55423

**YOU ARE HEREBY SUMMONED** and required to serve upon

Plaintiff's Attorney (Name and Address)

Joseph F. Posillico  
 Stephen J. Driscoll  
 Synnestvedt & Lechner, LLP  
 2600 Aramark Tower  
 1101 Market Street  
 Philadelphia, PA 19107-2950

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Michael E. Kunz, Clerk of Court

Date:

(By) Deputy Clerk

**SUMMONS IN A CIVIL ACTION**

UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF PENNSYLVANIA

COMAPER CORPORATION

Plaintiff

vs.

ANTEC, INC.  
 BEST BUY CO., INC.  
 MICRO ELECTRONICS, INC. and  
 DOES 1-20, inclusive

Defendants.

CIVIL ACTION NO.

TO: (NAME AND ADDRESS OF DEFENDANT)

MICRO ELECTRONICS, INC.  
 4119 Leap Road  
 Hilliard, OH 43026

**YOU ARE HEREBY SUMMONED** and required to serve upon

Plaintiff's Attorney (Name and Address)

Joseph F. Posillico  
 Stephen J. Driscoll  
 Synnestvedt & Lechner, LLP  
 2600 Aramark Tower  
 1101 Market Street  
 Philadelphia, PA 19107-2950

an answer to the complaint which is herewith served upon you, within 20 days after service of this summons upon you, exclusive of the date of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the complaint.

Michael E. Kunz, Clerk of Court

Date:

(By) Deputy Clerk

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

**CASE MANAGEMENT TRACK DESIGNATION FORM**

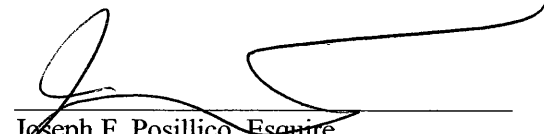
COMAPER CORPORATION	:	CIVIL ACTION NO.
	:	
v.	:	
ANTEC, INC.,	:	
BEST BUY CO., INC.,	:	
MICRO ELECTRONICS, INC., and	:	
DOES 1-20, inclusive	:	

In accordance with the Civil Justice Expense and Delay Reduction Plan of this court, counsel for plaintiff shall complete a case Management Track Designation Form in all civil cases at the time of filing the complaint and serve a copy on all defendants. (See § 1:03 of the plan set forth on the reverse side of this form.) In the event that a defendant does not agree with the plaintiff regarding said designation, that defendant shall, with its first appearance, submit to the clerk of court and serve on the plaintiff and all other parties, a case management track designation form specifying the track to which that defendant believes the case should be assigned.

**SELECT ONE OF THE FOLLOWING CASE MANAGEMENT TRACKS:**

- (a) Habeas Corpus - Cases brought under 28 U.S.C. §2241 through §2255. ( )
- (b) Social Security - Cases requesting review of a decision of the Secretary of Health and Human Services denying plaintiff Social Security Benefits. ( )
- (c) Arbitration - Cases required to be designated for arbitration under Local Civil Rule 53.2. ( )
- (d) Asbestos - Cases involving claims for personal injury or property damage from exposure to asbestos. ( )
- (e) Special Management - Cases that do not fall into tracks (a) through (d) that are commonly referred to as complex and that need special or intense management by the court. (See reverse side of this form for a detailed explanation of special management cases.) (X)
- (f) Standard Management - Cases that do not fall into any one of the other tracks. ( )

3/8/05  
Date

  
\_\_\_\_\_  
Joseph F. Posillico, Esquire  
Stephen J. Driscoll, Esquire  
Attorneys for Plaintiff

**FOR THE EASTERN DISTRICT OF PENNSYLVANIA - DESIGNATION FORM** to be used by counsel to indicate the category of the case for the purpose of assignment to appropriate calendar.

Address of Plaintiff(s): Comaper Corporation, 256 West Fifth Avenue, Collegeville, PA 19426

Address of Defendant(s): Antec, Inc., 47900 Fremont Blvd., Fremont, CA 94538  
Best Buy Co., Inc., 7601 Penn Avenue South, Richfield, MN 55423  
Micro Electronics, Inc., 4119 Leap Road, Hilliard, OH 43026

Place of Accident, Incident or Transaction:

Does this case involve multidistrict litigation possibilities? Yes ☐ No ☒

Civil cases are deemed related when yes is answered to any of the following questions:

1. Is this case related to property included in an earlier numbered suit pending or within one year previously terminated action in this court?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
2. Does this case involve the same issue of fact or grow out of the same transaction as a prior suit pending or within one year previously terminated action in this court?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
3. Does this case involve the validity or infringement of a patent already in suit or any earlier numbered case pending or within one year previously terminated action in this court?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

**CIVIL: (Place ✓ in ONE CATEGORY ONLY)****A. Federal Question Cases:****B. Diversity Jurisdiction Cases:**

1. <input type="checkbox"/> Indemnify Contract, Marine Contract, and All Other Contracts	1. <input type="checkbox"/> Insurance Contract and Other Contracts
2. <input type="checkbox"/> FELA	2. <input type="checkbox"/> Airplane Personal Injury
3. <input type="checkbox"/> Jones Act-Personal Injury	3. <input type="checkbox"/> Assault, Defamation
4. <input type="checkbox"/> Antitrust	4. <input type="checkbox"/> Marine Personal Injury
5. <input checked="" type="checkbox"/> Patent	5. <input type="checkbox"/> Motor Vehicle Personal Injury
6. <input type="checkbox"/> Labor-Management Relations	6. <input type="checkbox"/> Other Personal Injury (Please specify)
7. <input type="checkbox"/> Civil Rights	7. <input type="checkbox"/> Products Liability
8. <input type="checkbox"/> Habeas Corpus	8. <input type="checkbox"/> Products Liability - Asbestos
9. <input type="checkbox"/> Securities Act(s) Cases	9. <input type="checkbox"/> All other Diversity Cases
10. <input type="checkbox"/> Social Security Review Cases	(Please specify)
11. <input type="checkbox"/> All other Federal Question Cases	
(Please specify)	

**ARBITRATION CERTIFICATION**

(Check Appropriate Category)

I, JOSEPH F. POSILLICO or STEPHEN J. DRISCOLL, counsel of record do hereby certify:☐ Pursuant to Local Civil Rule 53.2, Section 3(c)(2), that to the best of my knowledge and belief, the damages recoverable in this civil action case exceed the sum of \$150,000.00 exclusive of interest and costs;☒ Relief other than monetary damages is sought.DATE: 3/8/05JOSEPH F. POSILLICO  
STEPHEN J. DRISCOLL  
Attorney-at-Law45,18971,086  
Attorney I.D. #**NOTE:** A trial de novo will be a trial by jury only if there has been compliance with F.R.C.P. 38.

I certify that, to my knowledge, the within case is not related to any case now pending or within one year previously terminated action in this court except as noted above.

DATE: \_\_\_\_\_

JOSEPH F. POSILLICO  
STEPHEN J. DRISCOLL  
Attorney-at-Law45,18971,086  
Attorney I.D. #

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

<b>Comaper Corporation</b>	:	
256 West Fifth Avenue	:	
Collegeville, Pennsylvania 19426	:	
	:	
Plaintiff,	:	
	:	Civil Action No.
v.	:	
	:	
<b>Antec, Inc.</b>	:	
47900 Fremont Boulevard	:	
Fremont, California 94538	:	
	:	
and	:	
	:	
<b>Best Buy Co., Inc.</b>	:	
7601 Penn Avenue South	:	
Richfield, Minnesota 55423	:	
	:	
and	:	
	:	
<b>Micro Electronics, Inc.</b>	:	
4119 Leap Road	:	
Hilliard, Ohio 43026	:	
	:	
and	:	
	:	
<b>DOES 1-20, inclusive</b>	:	
Addresses unknown at this time	:	
	:	
Defendants.	:	
	:	

**COMPLAINT**

Plaintiff, Comaper Corporation ("Comaper") for its complaint against defendants, Antec, Inc. ("Antec"), Best Buy Co., Inc. ("Best Buy"), and Micro Electronics, Inc., doing business as MicroCenter ("MicroCenter"), alleges as follows:



**THE PARTIES**

1. Plaintiff Comaper is a corporation organized and existing under the laws of the Commonwealth of Pennsylvania and having a place of business at 256 West Fifth Avenue, Collegeville, Pennsylvania 19426.

2. Upon information and belief, defendant Antec is a corporation of the state of California having its principal place of business at 47900 Fremont Boulevard, Fremont, California 94538.

3. Upon information and belief, defendant Best Buy is a corporation of the state of Minnesota having its principal place of business at 7601 Penn Avenue South, Richfield, Minnesota 55423.

4. Upon information and belief, defendant MicroCenter is a corporation of the state of Ohio having its principal place of business at 4119 Leap Road, Hilliard, Ohio 43026.

5. Comaper is informed and believes, and thereon alleges, that defendant Antec has committed the acts alleged within this judicial district. These acts include, but are not limited to, the manufacture, use, sale, and/or promotion of certain equipment for cooling the drive bay region of computers, with the knowledge and intent that the equipment would be sold, resold and/or used within this judicial district. This equipment includes, but is not necessarily limited to, computer accessories sold under the trade names "Hard Drive Cooling System with Temperature Monitors," SKU 6134577051, "HD Cooler," SKU 6134575011, and "Hard Disk Drive Cooler," SKU 6134577028.

6. Comaper is informed and believes, and thereon alleges, that defendant Best Buy has committed the acts alleged within this judicial district. These acts include, but are not

limited to, the sale and/or promotion of certain equipment for cooling the drive bay region of computers within this judicial district and with the knowledge and intent that the equipment would be sold, resold and/or used within this judicial district. This equipment includes, but is not necessarily limited to, computer accessories manufactures by Antec and sold under the trade names "Hard Drive Cooling System with Temperature Monitors," SKU 6134577051, "HD Cooler," SKU 6134575011, and "Hard Disk Drive Cooler," SKU 6134577028.

7. Comaper is informed and believes, and thereon alleges, that defendant MicroCenter has committed the acts alleged within this judicial district. These acts include, but are not limited to, the sale and promotion of certain equipment for cooling the drive bay region of computers within this judicial district and with the knowledge and intent that the equipment would be sold, resold and/or used within this judicial district. This equipment includes, but is not necessarily limited to, computer accessories manufactures by Antec and sold under the trade names "Hard Drive Cooling System with Temperature Monitors," SKU 6134577051, "HD Cooler," SKU 6134575011, and "Hard Disk Drive Cooler," SKU 6134577028.

#### **JURISDICTION AND VENUE**

8. This action arises under the patent laws of the United States, Title 35 of the United States Code. This Court has subject matter jurisdiction under 28 U.S.C. §1331 and §1338(a). Venue is proper in this judicial district under 28 U.S.C. §1391 and §1400(b).

**FACTS IN SUPPORT OF ALL CLAIMS FOR RELIEF**

9. On September 21, 1999, United States Letters Patent No. 5,955,955 ("955 patent"), entitled "Drive Bay Mounted Cooling Device," was issued to William Corcoran, and Gary T. Smith. A copy of the '955 patent is attached as Exhibit A.

10. Plaintiff Comaper is and has been the owner of the entire right and title to the '955 patent since May 20, 2004, and has the right to pursue all past damages for infringement of the '955 patent.

**CLAIM FOR RELIEF**  
**(Infringement of the '955 Patent)**

11. This is a claim for patent infringement under 35 U.S.C. §271 and §281.

12. Comaper hereby repeats, realleges and incorporates by reference paragraphs 1 through 9 of this Complaint as though fully set forth herein.

13. Comaper is informed and believes, and thereon alleges, that defendants Antec, Best Buy and MicroCenter through their agents, employees and servants, have infringed and induced others, and continue to induce others, to infringe at least claims 1, 7, and 12, of the '955 patent, in violation of 35 U.S.C. §271(b). These acts were not and are not authorized by Comaper.

14. Antec has received actual notice of the '955 patent by virtue of receiving a letter dated July 10, 2003 from the undersigned informing Antec of the '955 patent and providing a

copy therewith and has continued to engage in acts constituting infringement of the '955 patent subsequent to this date.

15. Best Buy has received actual notice of the '955 patent by virtue of receiving a letter dated July 10, 2003 from the undersigned informing Best Buy of the '955 patent and providing a copy therewith and has continued to engage in acts constituting infringement of the '955 patent subsequent to this date.

16. MicroCenter has received actual notice of the '955 patent by virtue of receiving a letter dated July 10, 2003 from the undersigned informing MicroCenter of the '955 patent and providing a copy therewith and has continued to engage in acts constituting infringement of the '955 patent subsequent to this date.

17. Comaper is informed and believes, and thereon alleges, that defendants Antec, Best Buy and MicroCenter have derived, received and will continue to derive and receive gains, profits and advantages in amounts not presently known by Comaper with certainty, from their acts of infringement.

18. Comaper is informed and believes, and thereon alleges, that such infringement has been and continues to be intentional, knowing, willful and deliberate, with full knowledge of Comaper's rights.

19. Due to the acts of infringement by defendants Antec, Best Buy and MicroCenter Comaper has suffered great and irreparable injury and harm.

**WHEREFORE**, Comaper prays for relief as follows:

A. that each of Antec, Best Buy and MicroCenter be adjudged to have infringed United States Letters Patent No. 5,955,955;

B. that each of Antec, Best Buy and MicroCenter be adjudged to have willfully and deliberately infringed United States Letters Patent No. 5,955,955;

C. that each of Antec, Best Buy and MicroCenter, their officers, agents, servants, employees and attorneys, and those persons in active concert or participation with them who receive actual notice of the Order, be preliminarily and permanently restrained from infringing United States Letters Patent No. 5,955,955;

D. that Antec, Best Buy and MicroCenter each account for damages to Comaper for its infringement of United States Letters Patent No. 5,955,955;

E. that a judgment be entered against Antec, Best Buy and MicroCenter awarding Comaper all damages to which it is entitled under 35 U.S.C. §284, including increased damages for defendant's willful infringement;

F. that the damages in this judgment be trebled for the willful and deliberate infringement of United States Letters Patent No. 5,955,955 by Antec, Best Buy and MicroCenter;

G. that an assessment be awarded to Comaper of interest on the damages so computed;

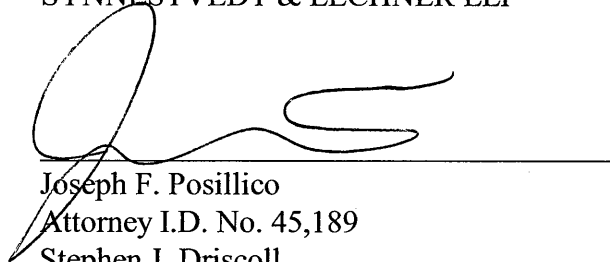
H. that the Court award Comaper its reasonable attorneys fees and costs pursuant to 35 U.S.C. §285; and

I. that Comaper receive such other and further relief as the Court may deem just and proper.

PLAINTIFF HEREBY DEMANDS A JURY TRIAL.

Respectfully submitted this 8th day of March 2005.

SYNNESTVEDT & LECHNER LLP

A handwritten signature in black ink, appearing to read 'J. Posillico', is written over a horizontal line. The signature is fluid and cursive, with a large loop at the beginning and a long, sweeping tail that ends in a small hook.

Joseph F. Posillico  
Attorney I.D. No. 45,189  
Stephen J. Driscoll  
Attorney I.D. No. 71,086

Attorneys for Plaintiff

Synnestvedt & Lechner, LLP  
2600 Aramark Tower  
1101 Market Street  
Philadelphia, PA 19107-2950

Telephone: (215) 923-4466  
Facsimile: (215) 923-2189

EXHIBIT A



US006065138A

**United States Patent** [19]

Gould et al.

[11] Patent Number: **6,065,138**[45] Date of Patent: **May 16, 2000**[54] **COMPUTER ACTIVITY MONITORING SYSTEM**[75] Inventors: **Brian J. Gould, Plainsboro; Steven D. Rudnik, Chester, both of N.J.**[73] Assignee: **Magnitude LLC, Plainsboro, N.J.**[21] Appl. No.: **08/779,934**[22] Filed: **Jan. 7, 1997****Related U.S. Application Data**

[60] Provisional application No. 60/014,463, Mar. 29, 1996.

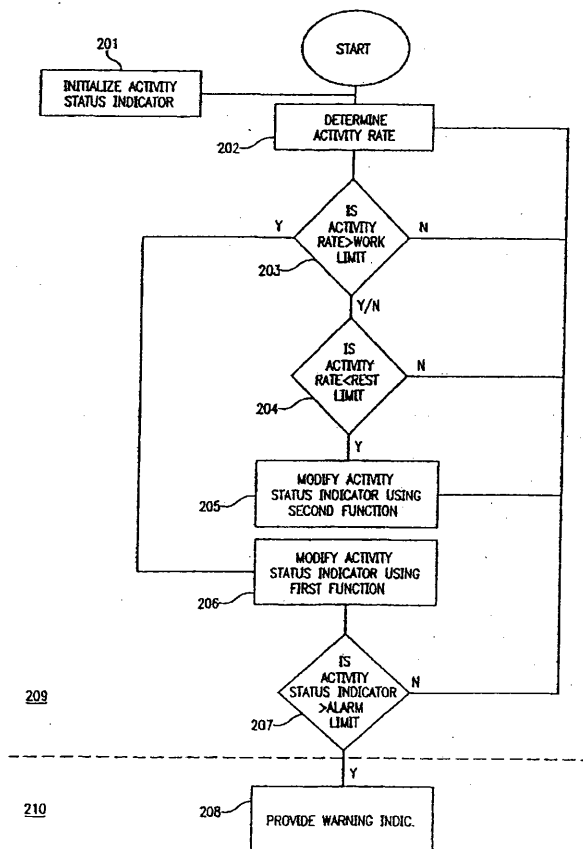
[51] Int. Cl.<sup>7</sup> ..... **H02H 3/05; G06F 3/00**[52] U.S. Cl. .... **714/47; 702/176; 702/186; 710/18**[58] Field of Search ..... **395/838, 926; 364/551.01, 569; 713/200, 201; 710/15-18; 702/176, 186; 714/47**[56] **References Cited****U.S. PATENT DOCUMENTS**

5,218,704 6/1993 Watts, Jr. et al. .  
 5,305,238 4/1994 Starr, III et al. .... 364/569  
 5,349,662 9/1994 Johnson et al. .  
 5,564,015 10/1996 Bunnell ..... 395/184.01

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*Primary Examiner—Dieu-Minh T. Le**Attorney, Agent, or Firm—Synnestvedt & Lechner LLP*[57] **ABSTRACT**

A computer activity monitoring system is disclosed for monitoring a user's input on a computer having a processor, memory, and input unit. The system functions by first initializing an activity status indicator in the memory. Next, the activity of the operator's input device is measured over a time period to determine an activity rate. The activity rate is then compared to at least one limit selected from the group consisting of a work limit and a rest limit. If the activity rate is greater than the work limit, then the activity status indicator is adjusted according to a first function. If the activity is less than the rest limit, then the activity status indicator is adjusted according to a second function. A warning is indicated if the activity status indicator reaches a predetermined alarm level. Also disclosed is an apparatus for performing this method and a computer readable medium, such as a floppy disk, hard drive, CD ROM, or tape, having instructions for performing this method.

**19 Claims, 5 Drawing Sheets**



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Sheet 1 of 5

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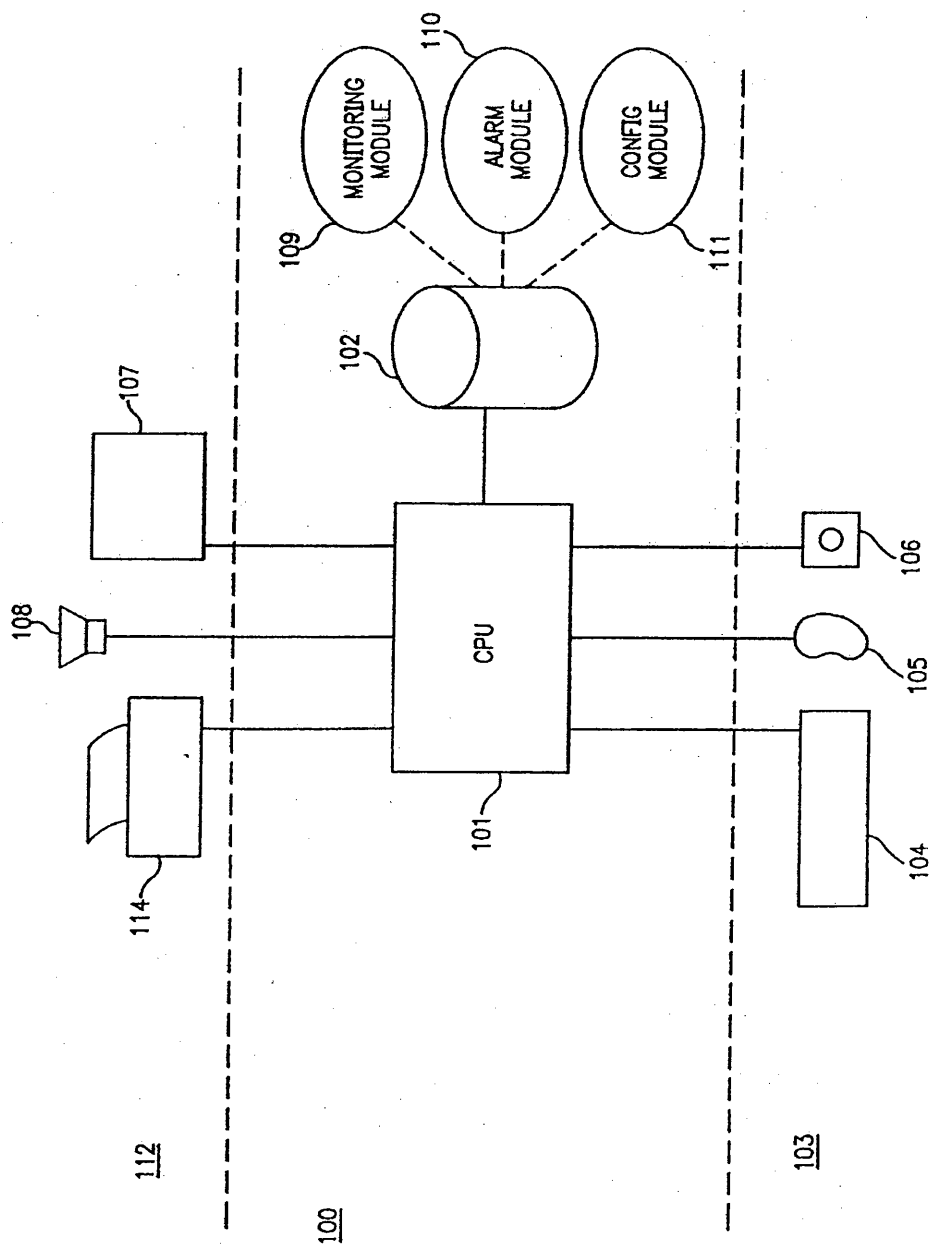


FIG. 1

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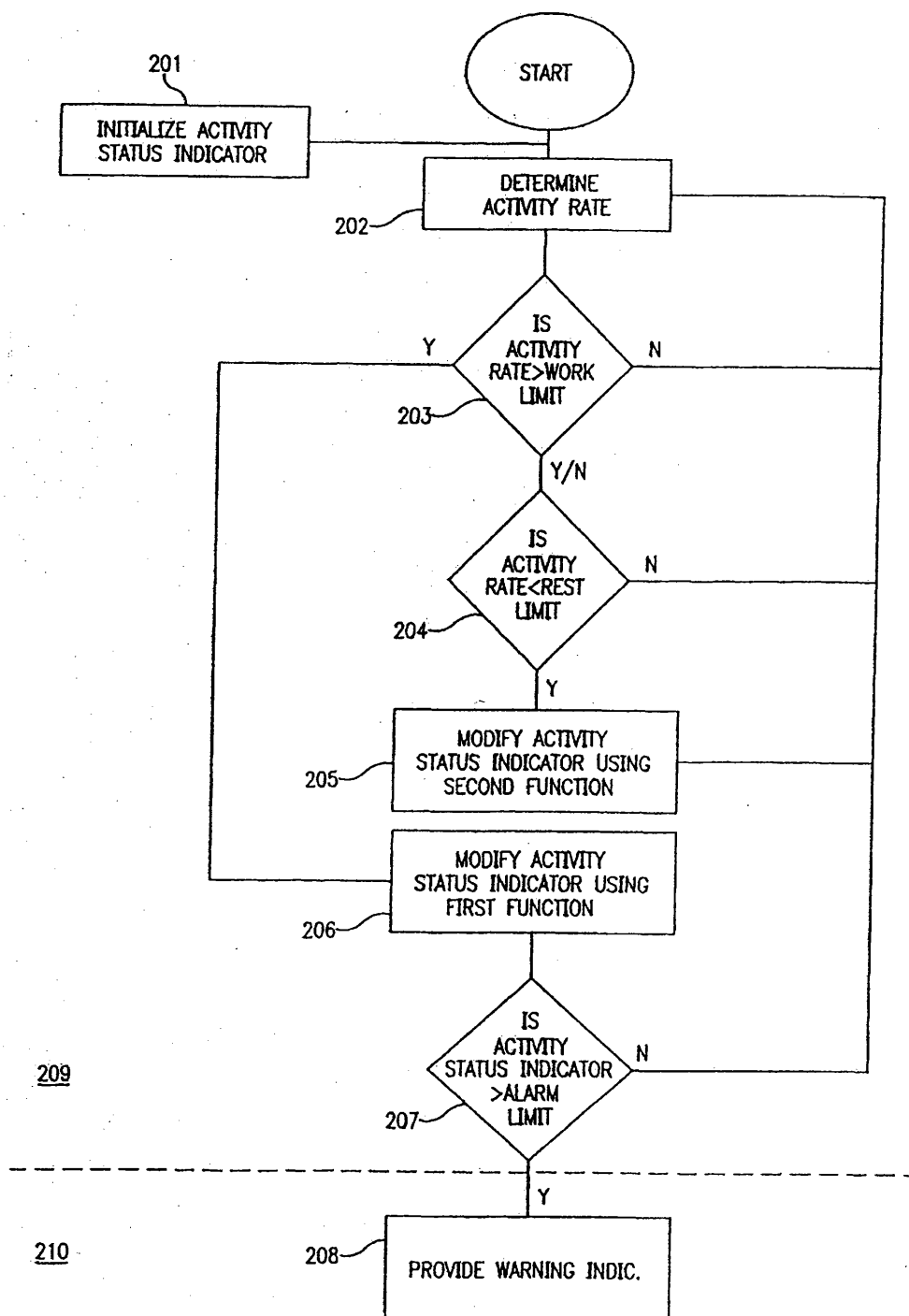


FIG. 2

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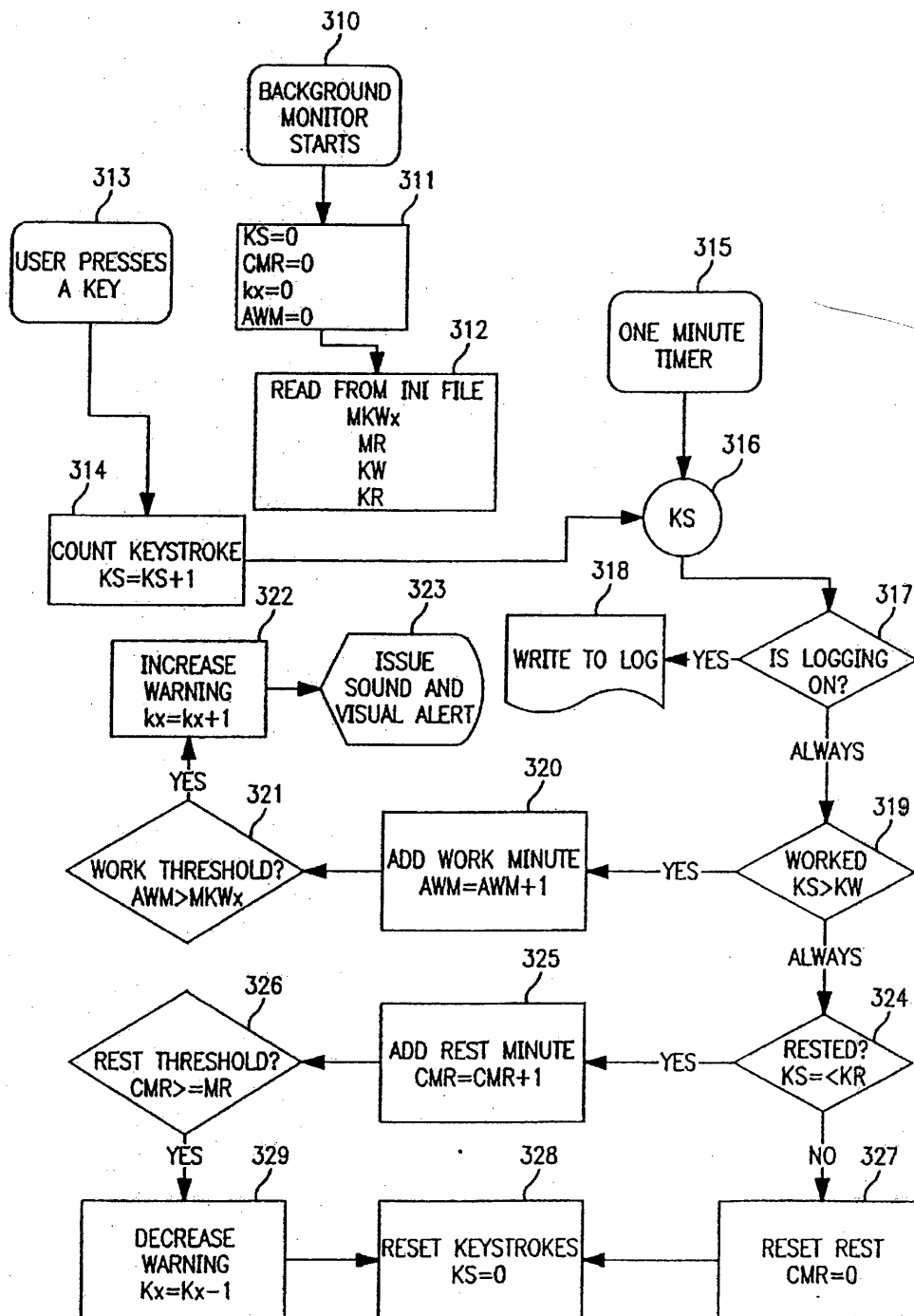


FIG. 3

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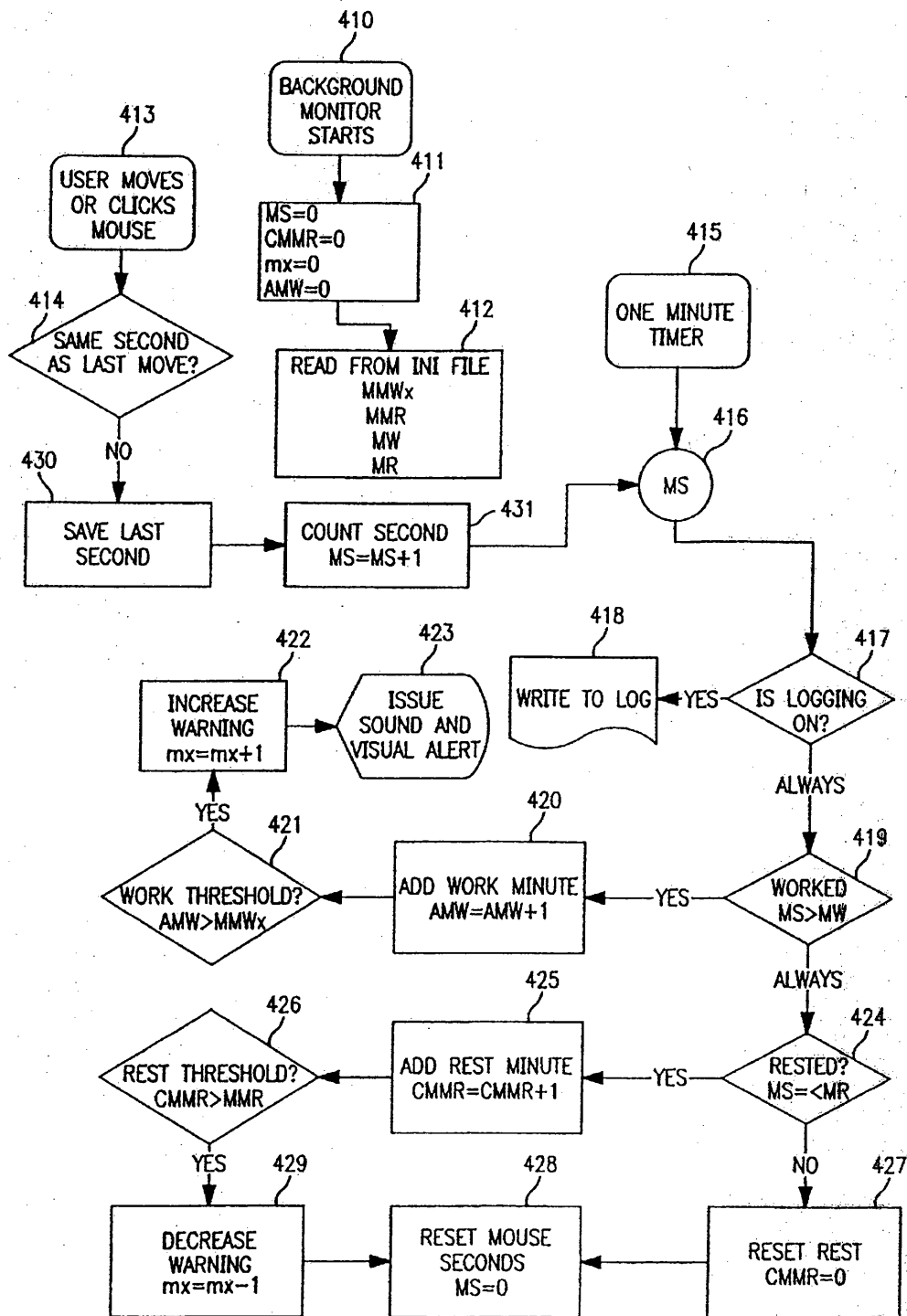


FIG. 4

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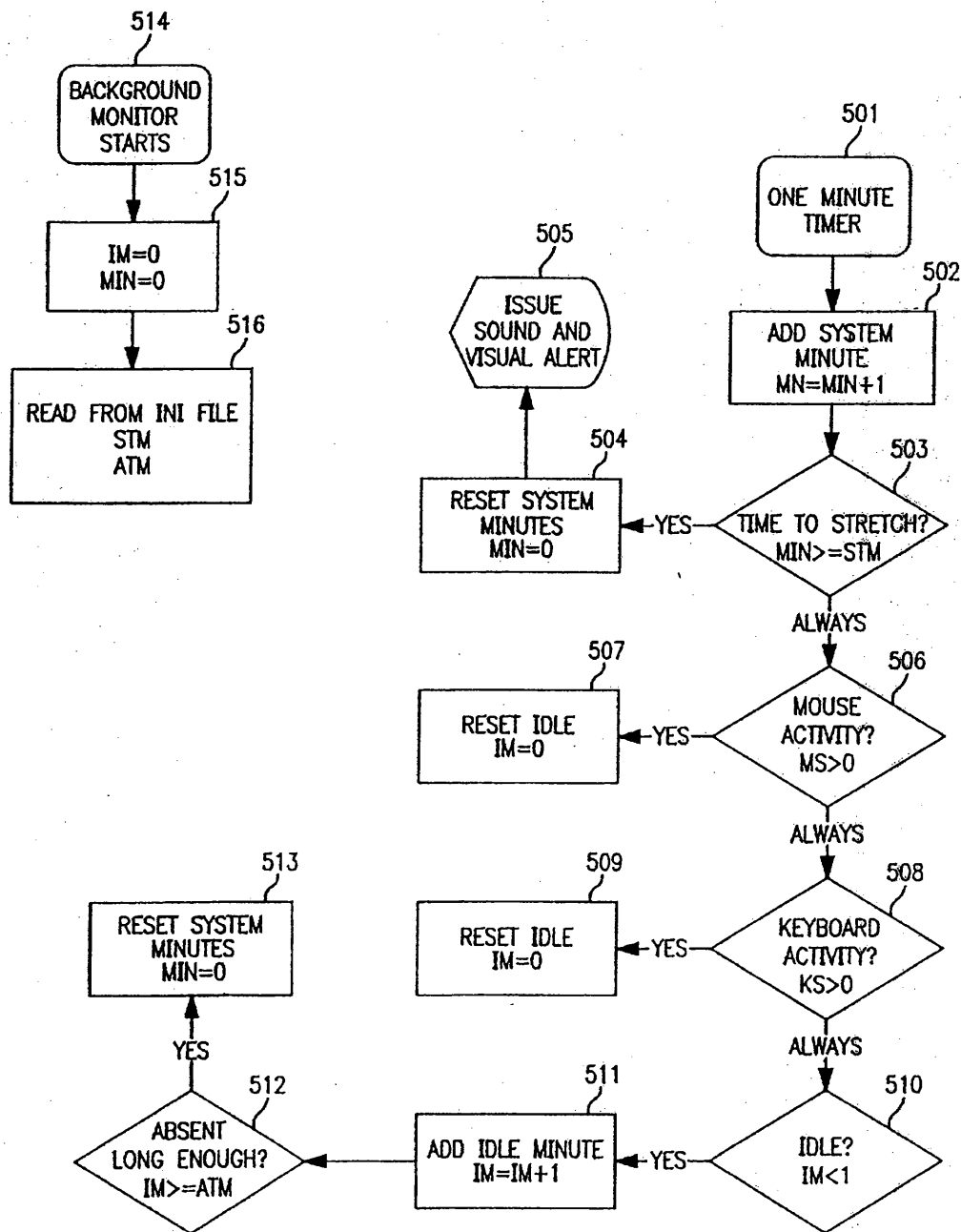


FIG. 5

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## COMPUTER ACTIVITY MONITORING SYSTEM

### REFERENCE TO PROVISIONAL APPLICATION

This application relates to a provisional application, Application No. 60/014,463, filed on Mar. 29, 1996, entitled "Computer Activity Monitoring Program."

### BACKGROUND OF THE INVENTION

#### 1. Field of Invention

The present invention relates generally to a system for monitoring the activity rate of a user on a computer input device. More specifically, the invention relates to a system that resides in a computer and monitors a user's activity rate and warns the user when a rest is warranted to reduce repetitive stress injury (RSI).

#### 2. Background

Repetitive stress (or strain) injury (RSI) is a classification of diseases caused by the excessive use of joints. It is a subclassification of Cumulative Trauma Disorder (CTD). One common form of RSI is Carpal Tunnel Syndrome (CTS) which can be caused by excessive typing among other activities. The carpal tunnel is a channel in the wrist where tendons and the median nerve connect the arm to the hand. Through excessive use, the tendons become swollen and pinch the nerve. RSI typically manifests itself only after years of excessive typing. Furthermore, the pain of RSI frequently is delayed, and, thus, a person may type comfortably all day but experience great pain later in the evening.

RSI accounts for a large portion of work-related illnesses, and the incidence of RSI is expected to grow as the number of people operating keyboards increases. The impact of RSI is measured not only in the pain and suffering of its victims, but also in time lost from work and medical costs. If surgery is required for both hands, medical costs can become particularly high. Moreover, while surgery and medication may alleviate some of the symptoms, there is no cure.

RSI is caused not by the computer input devices, but rather by the user's behavior. Intense typing, that is, typing for long periods without a break, slowly damages the soft tissues of a person's hands, wrists, and arms. Due to its insidious nature, RSI often remains undetected until irreparable injury is sustained. RSI may be avoidable or minimized, however, through proper work habits. One way of avoiding carpal tunnel syndrome involves typing less and/or taking frequent breaks. A need therefore exists for a system that monitors a user's input activity level and prompts him to rest before sustaining injury. The present invention fulfills this need among others.

### SUMMARY OF THE PRESENT INVENTION

The present invention is directed to a monitoring and prompting system which reduces the risk of Repetitive Stress Injury (RSI) faced by people using input devices of the type commonly associated with computers. The system operates on a computer having a processor, memory, and input means. The system functions by first initializing an activity status indicator in the memory. Next, the activity of the operator's input device is measured over a time period to determine an activity rate. The activity rate is then compared to at least one limit selected from the group consisting of a work limit and a rest limit. If the activity rate is greater than the work limit, then the activity status indicator is adjusted according to a first function. If the activity is less than the

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rest limit, then the activity status indicator is adjusted according to a second function. A warning is indicated if the activity status indicator reaches a predetermined alarm level. Other embodiments of the invention include an apparatus for performing this method and a computer readable medium, such as a floppy disk, hard drive, CD ROM, or tape, having instructions for performing this method.

Therefore, the present device monitors computer usage patterns over time and warns the user when to break a dangerous trend in repetitive usage of an input device, such as a keyboard or mouse. Warnings or prompts take the form of pop-up windows that appear on the user's screen at appropriate times.

Although breaks should be taken, it is understood that often they are not practical. For this reason, multiple warning levels may be used wherein each warning corresponds to an alarm level of particular severity. If the user ignores one warning and continues working, the system will continue to monitor input and warn the user when a higher level alarm is reached.

Since warnings may interfere with the user's thought process at the instant they occur, a busy allowance timer may be set. This timer will delay the warning until the timer has expired or the system remains idle for a predetermined period of time, e.g., three seconds.

Another embodiment of the invention involves a stretch timer that warns the user that he has been sitting for an extended period and should stand up to stretch. This warning is based on time and not activity rate. Within the stretch timer, the user can set parameters which will reset the stretch timer if the system is completely idle for a user-defined period of time.

Still another embodiment of the invention involves a logging feature. The logging features provides an record of the user's typing rate. Such a record may be beneficial not only for ensuring that the user has rested adequately, but also for monitoring the user's activity from a productivity perspective.

In yet another embodiment, when warnings occur, the system will provide informative and/or entertaining pictures, text and sounds through the use of plug-in modules. These modules may be integral to the device or discrete after market packages. They can even be created by the user using the configuration module. The present invention therefore provides an early warning system to avoid RSI. By observing its warnings, the user can reduce the chance of RSI, rather than waiting until the disease manifests itself—which is often too late.

### BRIEF DESCRIPTIONS OF THE DRAWINGS

The features of the present invention, which are believed to be novel, are set forth with particularity in the appended claims. The invention may best be understood by reference to the following description taken in conjunction with the accompanying drawings, wherein like reference numerals identify like elements, and wherein:

FIG. 1 shows a schematic view of the overall system;

FIG. 2 shows a general flow diagram of the overall process and interaction between the three modules;

FIG. 3 shows a flow diagram of the keyboard monitoring subsystem;

FIG. 4 shows a flow diagram of the mouse monitoring subsystem; and

FIG. 5 shows a flow diagram of the stretch timer.

### DETAILED DESCRIPTION OF THE PRESENT INVENTION

The monitoring and prompting system of the present invention (herein "monitoring system") enables a user to

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regulate his activity rate on a computer. The system does not require specialized computer hardware or software. It is designed to operate on conventional computers using conventional operating platforms.

A schematic view of a typical system 100 is shown in FIG. 1. In this figure, a CPU 101 is operatively connected to operator input means 103 and operator display means 112. The operator input means 103 includes any device which requires physical manipulation by the user to input information into the CPU 101 such as a keyboard 104, a mouse 105, or a joystick 106. The operator display means 112 includes any device that provides output to the operator such as a monitor 107, speaker 108, or printer 114.

Operatively connected to the CPU 101 is memory 102 which contains a program or instructional means for the system 100 to perform the process of the present invention. The instructional means may also be stored in a computer readable medium or in a combination of mediums such as disk, tape, ROM or RAM memory.

In one embodiment, the program comprises three modules—namely (1) a monitoring module 109, (2) an alarm module 110, and (3) a configuration module 111 as shown in FIG. 1. When configured with the monitoring module 109, the computer has monitoring means for determining a user's activity rate by measuring and recording the activity of the input means over a predetermined time. This measurement can be performed periodically or continuously. The user's activity rate may be examined to monitor the performance of the user. In one embodiment, the monitoring means compares the activity rate to an alarm limit. When configured with the alarm module, the computer has alarm means for indicating a warning if the activity rate reaches an alarm limit. The configuration module 111 is used to customize the monitoring means and the alarm means.

A preferred process embodiment of the invention is shown in the flow diagram of FIG. 2. First, in Block 201 of the system's monitoring means 209, an activity status indicator is initiated. Next, Block 202 measures the activity of the operator's input device over a time period to determine an activity rate. The activity rate is then compared to at least one limit selected from the group consisting of a work limit in Block 203, and a rest limit in Block 204. If the activity rate is greater than the work limit, then Block 206 adjusts the activity status indicator according to a first function. If the activity is less than the rest limit, then Block 207 adjusts the activity status indicator according to a second function. A warning is indicated in Block 208 if the activity status indicator reaches a predetermined alarm level as determined in Block 207 of the system's alarm means 210. Each of the modules will now be considered in more detail.

#### 1. Monitoring Module

The Monitoring Module in the preferred embodiment comprises a subroutine for each input device. In a typical system, this involves two separate subroutines—namely, (a) a keyboard monitor and (b) a mouse monitor. Additionally, it is preferred to have (c) a stretch monitor which monitors the user's time working on the computer.

##### a. Keyboard Monitoring

The keyboard monitor measures the user's activity rate on a keyboard. In the preferred embodiment, individual keystrokes are counted rather than the resulting input of such keystrokes. That is, keystrokes, such as backspace, Alt, Shift, Control and arrow keys, which may not necessarily result in the input of a character, are nevertheless counted. Likewise, a key which is held down is counted as a single keystroke even though it may result in multiple character input.

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One embodiment of the keyboard monitor is depicted in the FIG. 3 as a flow chart. In Block 310, the background monitor is started. Next, Block 311 sets the following values to zero: down keystrokes counted in a minute (KS) (also referred to as "the activity rate"), current activity status level (KX), consecutive minutes of rest (CMR), and accumulated keyboard work minutes (AWM). Block 312 initializes the following according to the user's configurations: minutes of work to promote next alarm level (MKWx), minutes of rest to demote alarm level (MR), number of keystrokes per minute considered work (KW) (also referred to as the "work limit"), and number of keystrokes per minute considered rest (KR) (also referred to as the "rest limit").

In this particular embodiment, the system operates in one minute intervals as regulated by Block 315. It should be understood, however, that the interval is arbitrary and may be set to any value. Every time the a key is depressed, it is recorded in Block 313. Block 314 counts the number of keystrokes in a period by adding one to KS each time a stroke is recorded in Block 313. After Block 315 times out a minute, the current KS value is acknowledged in Block 316. Block 317 determines if the logging option has been selected (discussed below). If so, a record of the KS value is made in Block 318.

Block 319 determines if KS is greater than KW, the work limit. If so, a work minute is added to AWM in Block 320. Block 321 then determines if the user has exceeded the number needed to ascend to the next activity status level by determining if AWM is greater than MKWx. If so, Block 322 increases the activity status by one ( $KX = KX + 1$ ). It should be understood, however, that the activity status can be adjusted in any manner to meet the user's needs. In this embodiment, once Block 322, increases the activity status by one, an alarm level is reached, and Block 323 issues a warning, which may be audio, visual or both. Although a alarm level was reached in this embodiment by just one incremental increase, it should be understood that this level is configurable. For example, the system may be configured such that activity status must increase by 5 before reaching the alarm level. Additionally, the preferred embodiment of the invention comprises multiple alarm levels, each level corresponding to a particular warning. For example, in a system with five alarm levels, when the activity status graduates from one alarm level to another, a warning increased severity will be given. It may also be preferred to identify how many work minutes will prompt the next alarm level.

In this particular embodiment, Block 324 determines if KS is less than or equal to KR regardless of the determination in Block 319. It should be understood, however, that this step might be performed only if the user activity did not exceed the activity limit. Likewise, the determination of Block 319 might be performed only if the activity rate is above the rest limit as determined in Block 324.

If Block 324 determines that KS is less than or equal to KR, then a rest minute is added to CMR in Block 325, and Block 326 determines if a rest limit has been reached ( $CMR > MKWX$ ). If so, the alarm level is reduced by one in Block 329. Block 328 then sets KS back to zero and the process begins again. It should be understood that effect of a rest minute on the alarm level is configurable. That is, a rest minute can decrease the alarm condition by one as in this embodiment, or according to any other function the user specifies (discussed below).

If Block 324 determines that KS is not less than or equal to KR, then Block 327 resets CMR to zero, Block 328 resets KS to zero, and the process begins again.



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In many cases, the user will spend time where the number of keys pressed is between the work and rest thresholds. These periods will not move the user closer to the next higher alarm level, nor will they reduce the current alarm level.

In this embodiment, MKWx and AWM cooperate as a first function, and MR and CMR cooperate as a second function. The first function correlates the number of work minutes to the activity status. For example, if MKWx is set to then, then five work minutes must be recorded before the activity status, in this case, is upwardly adjusted by one. It should be understood, that this adjustment is configurable and the status indicator may be increased, decreased, re-initialized, or adjusted in any other way to meet the user's needs. Likewise, MKWx can be set to any value to affect the sensitivity of a work minute on the activity status.

The second function correlates the number of rest minutes to the activity status. For example, if MR is set to five, then five consecutive rest minutes must be recorded before the activity status indicator is, in this case, downwardly adjusted by one. As with the first function, it should be understood, that this adjustment is configurable and the status indicator may be increased, decreased, re-initialized, or adjusted in any other way to meet the user's needs. This particular embodiment of the invention requires that rest minutes be consecutive unlike work minutes. Consequently, once the user has a minute that is not under the rest key count the user must restart resting before the warning level will be reduced. It should be understood, however, that this is a configurable and the user can select whether or not rest periods must be consecutive. Additionally, MR can be set to any value to affect the sensitivity of a work minute on the activity status.

Table 1 contains an example of a user's typing activity and the program's response. In this example, 50 keystrokes or more are considered work, 5 keystrokes or less are considered rest, and 5 rest minutes will reduce the warning level. The accumulated work column shows how many minutes of work are being counted towards reaching the next warning level. Once the number of accumulated work minutes is equal to the next threshold level, an alarm will be initiated. When the number of accumulated rest minutes is equal to the rest period (5 in this case), the accumulated work level will be reset to zero and the current warning level will be reduced by one.

TABLE 1

Minute	Rate	Work Minute	Rest Minute	Remark	Status
1	30	0	0	between	0
2	53	1	0	work	0
3	57	2	0	work	0
4	49	2	0	between	0
5	53	3	0	work	0
6	56	4	0	work	0
7	59	5	0	work	1
8	3	5	1	rest	1
9	4	5	2	rest	1
10	2	5	3	rest	1
11	56	6	0	work	1
12	0	6	1	rest	1
13	0	6	2	rest	1
14	0	6	3	rest	1
15	0	6	4	rest	1
16	0	0	5	reset	0
17	55	1	0	work	0
18	57	2	0	work	0
19	32	2	0	between	0
20	56	3	0	work	0
21	0	3	1	rest	0

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TABLE 1-continued

Minute	Rate	Work Minute	Rest Minute	Remark	Status
22	0	3	2	rest	0
23	0	3	3	rest	0
24	0	3	4	rest	0
25	5	0	5	reset	0
26	56	1	0	work	0

Note that during minutes 1 and 4 the amount of work was between the work and rest periods. Neither work nor rest minutes were accumulated. During minute 8, the user dropped into the rest range. But then he began working again in minute 11, so the accumulated rest counter was reset to zero—only consecutive rest minutes are counted towards dropping the warning level. Finally, the user rested from minutes 12 through 16 and the warning level was reduced.

#### b. Mouse Work Monitoring

Unlike keystrokes, mouse activity (or trackball, or other pointing device activity) is not discrete. Rather mouse activity tends to be continuous, and is measured consequently according to time units. For example, if a second is used as the time unit, every time the mouse is moved within a second, that second counts as one "mouse-second." A mouse activity rate can be measured in terms of the number of mouse-seconds over a predetermined period of time. For example, if a user moves a mouse for 45 mouse-seconds within a minute, the mouse activity rate is 45 mouse-seconds/minute. Accordingly, since there are 60 seconds in a minute, the maximum mouse activity rate is 60 mouse-seconds/minute.

The mouse monitor contains configurable parameters that are functionally similar to those of the keyboard monitor. These parameters include a work limit, a rest limit, a first function, a second function, and at least one alarm limit. The functionality/configurability of these parameters therefore will not be repeated here, although it should be understood that such functionality/configurability is intended.

One particular embodiment of the mouse monitor is shown in FIG. 4 in flow chart form, which is similar to FIG. 3. In Block 410, the background monitor is started. Next, Block 401 sets the following values to zero: mouse activity rate (MS) (in this case, mouse-seconds/minute), consecutive minutes of rest (CMMR), and current activity status level (MX). Block 402 initializes the following according to the user's configuration instructions: minutes of work to promote next warning level (MMWx), minutes of rest to demote warning level (MMR), mouse activity rate considered work (MW) (work limit), and mouse activity rate considered rest (MR) (rest limit).

In this particular embodiment as in the keyboard embodiment, the system interval is defined as a minute as regulated by Block 10. As stated above, this is arbitrary and, as such, may be set to any value.

Mouse movement is recorded in Block 113. Block 114 determines if the mouse movement was in the same second as the last mouse movement. If not, Block 130 records the event as a mouse-second. Block 131 counts the number of mouse-seconds in a period by adding one to MS each time a mouse-second is recorded in Block 130. After Block 115 times out a minute, the current MS value, i.e., the activity rate, is recorded in Block 116. Block 117 determines if the Logging option has been selected. If so, a record of the MS value is made in Block 118.

Block 119 determines if MS is greater than MW. If so, a work minute is added to AMW in Block 120 (AMW=



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AMW+1). Block 421 then determines if the user has exceeded the number needed to ascend to the next activity status by determining if AMW is greater than MMWx. If so, Block 122 increases the activity status by one ( $MX=MX+1$ ). As with the keyboard monitor, the alarm level in this embodiment is set to one. Therefore, as soon as the activity reaches one, Block 123 issues a warning, which may be audio, visual or both.

Regardless of the determination in Block 119, Block 124 determines if MS is less than or equal to MR. If so, then a rest minute is added to CMMR in Block 125. Next, Block 126 determines if the number of consecutive rest minutes has reached a level needed to adjust the next activity status by determining if CMMR is greater than MMR. If so, the activity status level is reduced by one in Block 129. Block 128 then sets MS back to zero and the process begins again.

If Block 124 determines that MS is not less than or equal to MR, then Block 127 resets CMR to zero, Block 128 resets MS to zero, and the process begins again. Like the keyboard monitor, this embodiment therefore requires that rest minutes be consecutive unlike work minutes.

The example provided in Table 1 for the keyboard monitor is applicable to the mouse monitor as well, except rather than "keystrokes" it should read "mouse-seconds".

#### c. Stretch Monitor

The stretch monitor monitors the time at which the user is working at the computer and suggests stretch breaks. Stretching or similar physical stimulation is known to reduce the effects of RSI. Moreover, it provides a break from work which in itself is highly beneficial as discussed above. Every minute that the user works at the computer (including moving the mouse or pressing a key) will be counted as a minute that the user has been sitting at the computer. Once the user has been sitting for a period of time greater than the stretch time, the user will be advised to stand and stretch.

It is possible, however, that the user might get up to make a copy or use the bathroom. In this event, there is a configurable idle minute counter to reset stretch timer. That is, if the PC is untouched for more than the preset idle minutes, e.g., 5 minutes, the stretch timer will reset.

Setting the stretch timer value to zero will disable it. Setting the idle minutes to reset the stretch timer to zero will cause the stretch timer to be invoked every time independent of PC activity. For example, if the stretch timer is set to 90 minutes and the Idle minutes to reset stretch timer is set to zero, the stretch warning will be invoked every 90 minutes regardless of system activity.

A particular embodiment of the stretch timer is shown in FIG. 5 as a flow chart. To initialize the system, the background monitor starts in block 514. Block 515 zeros the idle minutes (IM) and the minutes since the last stretch (MIN), while Block 516 reads for memory to initialize the values for the minutes to stretch timer (STM) and absent timer minutes (ATM).

The timing interval of the system is set by Block 501, which in this case is one minute. After every minute, a minute is added to MIN in Block 502. Block 503 determines if it is time to stretch by determining if MIN is greater than or equal to STM. If so, Block 504 resets MIN to zero, and Block 505 issues a warning that may be visual, audio, or both.

Regardless of the determination of Block 503, Block 506 determines whether there is mouse activity by determining if MS is greater than zero. If yes, then Block 509 resets IM to zero.

Regardless of the determination of Block 508, Block 510 determines whether the mouse is idle by determining if IM

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is less than one. If yes, one is added to the current idle minute in Block 511. Next, Block 512 determines if the user has been absent enough by determining if IM is greater than or equal to ATM. If so, Block 513 resets the system minutes to zero. It should be understood that this particular embodiment is for demonstrative purposes and should not be used to curtail the scope of the invention.

#### 2. Alarm Module

##### a. Warning Indications

A warning is provided when an alarm level is reached. As mentioned above an alarm level may be reached due to excessive keyboard or mouse usage, and/or continuous time behind the computer. The basic intent behind this embodiment is to notify the user of the need for a break. Preferably, the user can decide whether to take a break or cancel the warning program before the rest period has been observed.

In an other embodiment, the monitoring system is configured to monitor a user's performance and provide an indication of the user's activity rate for evaluation purposes. One embodiment issues a warning when the user either is working to hard and needs a rest or is not working hard enough and should increase the activity rate.

In the preferred embodiment, a plurality of warnings are used which correspond to alarm levels of increasing severity.

If the user ignores one warning and continues to work to the next alarm level, then a second warning will be given which indicates the increased need to take a break. It is preferred that the higher level warnings become more intrusive into the user's work, thereby requiring him to take proactive steps to proceed. For those users particularly prone to RSI, when the highest warning level is reached, the monitoring system can even block further user input until the rest period expires. Alternatively, the highest warning level may be repeatedly indicted until a break is observed.

An alarm condition can be indicated through visual or audio means or a combination thereof. The alarm's window characteristics are defined in the configuration module. The following are possible configurations:

Alarm always on top: the alarm warning window will always be visible on the user's computer screen once a alarm condition is reached;

Alarm as full screen: the alarm warning window will occupy the full screen during an alarm;

Start alarm as icon: the alarm warning window will appear as an icon on the user's screen. Double clicking this icon will restore the alarm to its normal window size;

Alarm takes focus: the alarm warning window will assume control of the keyboard and mouse upon an alarm condition;

Remain after rest: the alarm program will not disappear after a rest break;

Mute all sounds: the alarm program will not play any sounds;

Show current time: the alarm program will display the current time during an alarm in the lower left corner;

Show window title bar: a title bar will appear at the top of the alarm window;

Show status bar: an indicator (e.g., horizontal scroll bars) appears to indicate how many accumulated work minutes will cause the next warning to be issued

Create log file: the alarm program will keep a log of the keyboard and mouse usage for later analysis. (See Logging below).

##### b. Warning Modules

In addition to the warning indications listed above, the present invention provides for specialized warnings packages or modules. These warning modules are collections of

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sounds, pictures and text that may inform and entertain a user. A visually or audibly stimulating warning is preferred since it is more likely to entice a user to rest. More Preferable is a warning that actually encourages the user to stretch and perform some simple exercises during the rest periods.

In one embodiment, each warning module is a collection of a sound catalog, a text catalog, and a picture catalog. If the user prefers only one sound, picture, or text message, the user can bypass the catalogs and specify his preference. Alternatively, the user may desire that the catalog items be selected randomly during each alarm. These warning modules can be configured by the user using the configuration module, or they can be purchased as after-market components. It is anticipated that businesses may compile such warning modules as a means of advertising products and educating consumers.

#### c. Busy Allowance

In most cases, a warning is triggered because the user is typing or drawing at a high rate while concentrating on the task at hand. It would be difficult to suddenly lose concentration and stop all work when the warning occurs. The busy allowance timer therefore provides a grace period wherein the user can continue working without interruption. With busy allowance set, the warning will be initiated and the system will beep up periodically until the user stops using the system. Once a the user is idle or the busy allowance timer expires (configurable), the warning will be activated. Busy allowance is configured by the user. When set to zero, there is no busy allowance before warnings.

#### d. Logging

The monitor system also may comprise logging means for recording user activity. If selected, every minute the monitoring device logs the current number of mouse seconds and keystrokes into a log file. These logs can be used to monitor user performance and work habits. For example, in one embodiment, the log file contains one entry per minute in the following format: ddd hhmmss kc mc kw ku mu mw sit

Where:

ddd day of year (1-66)

hhmmss hours, minutes and seconds of the day

kc key count from the last minute

mc mouse count from the last minute

kw key warning level

ku key work minutes on the way to the next warning

mu mouse work minutes on the way to the next warning

mw mouse warning level

sit sit time in minutes

checksum checksum value used to prevent log tampering

Other possible log entries include start time and warning messages. It should be understood, that the log record is configurable according to the user's need.

#### 3. Configuration Module

The present invention provides for a system that is fully configurable to suit the needs of a particular user. Configurable parameters include the work and rest limits for keystrokes and mouse usage, the alarm limits, the effect of a work period on the activity status (first function) for the mouse and keyboard, and the effect of rest period on the activity status (second function) for the mouse and keyboard. Additionally, the configuration module can be used to select the preferred warning indication, or to generate warning modules specific to a user's interests.

Aside from operating parameters, the environment aspects of monitoring system are also flexible, and may be customized in many ways to create unique and personal

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versions that are sensitive to the user's situation. The user can set the monitoring device to automatically start with Windows, or what ever operating system is being used, always keep warnings on the top of the user's Windows "desktop," or the equivalent, cover the full screen area or just a small area, operate as an icon-only warning service, remain visible at all times or just during warnings, play sound files during warnings (randomly if desired), display pictures during warnings (randomly if desired), display messages during warnings (randomly if desired), maintain catalogs of messages/sounds/pictures, display the current time in addition to remaining break time, appear in user designed views including color selection, and beep any number of seconds prior to interruption by an warning.

Obviously, numerous modifications and variations of the present invention are possible in the light of the above teachings. For example, the steps may performed in any order, and other methods of accounting for the activity and rest as a function of time may be developed. Moreover, the monitoring system may be configured to monitor a user's performance and provide an indication of the user's activity rate for evaluation purposes. Indeed, the invention is useful in any application where monitoring activity rate of a user is important. It is therefore understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

What is claimed is:

1. A method for monitoring a user's activity rate on a computer, said computer having a processor, input means, and memory having an initialized activity status indicator, said computer being configured by instructional means resident in said memory to perform said method comprising the steps of:

measuring the activity of said input means over a time period to determine an activity rate;

comparing said activity rate to at least one limit selected from the group consisting of a work limit and a rest limit, if said activity rate is greater than said work limit, then adjusting said activity status indicator according to a first function, if said activity is less than said rest limit, then adjusting said activity status indicator according to a second function; and

signaling a warning if said activity status indicator reaches a predetermined alarm level.

2. The method of claim 1, wherein a plurality of warnings is used, each warning corresponding to a different alarm level having a particular severity.

3. The method of claim 1, further comprising:

delaying said warning either until said input means is idle, or after a predetermined period of time elapses.

4. The method of claim 1, further comprising:

measuring time between idle time of said input means, and signalling a stretch warning when said time reaches a predetermined time limit.

5. The method of claim 1, wherein said warning involves generating pictures, text, or sounds using at least one warning module.

6. The method of claim 5, wherein said module is a discrete module.

7. The method of claim 3, further comprising:

outputting a log based on said activity rate.

8. A device for monitoring a user's input activity, said device comprising:

means for initializing an activity status indicator;

means for measuring the activity of a user's input means over a time period to determine an activity rate;

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means for comparing said activity rate to at least one limit selected from the group consisting of a work limit and a rest limit, if said activity rate is greater than said work limit, then adjusting said activity status indicator according to a first function, if said activity is less than said rest number, then adjusting said activity status indicator according to a second predetermined function; and

means for signaling a warning if said activity status indicator reaches a predetermined alarm level.

9. The device of claim 8, wherein a plurality of warnings is used, each warning corresponding to a different predetermined alarm level having a particular severity.

10. The device of claim 8, further comprising:

means for delaying said warning either until said input means is idle, or after a predetermined period of time elapses.

11. The device of claim 8, further comprising:

means for measuring time between idle time of said input means and signaling a stretch warning when said time reaches a predetermined time limit.

12. The device of claim 8, further comprising:

at least one warning module having means for generating pictures, text, or sounds when said warning is signaled.

13. The device of claim 12, wherein said module is a discrete module.

14. A warning module for use with a system that monitors a user's input activity, said system comprising

means for initializing an activity status indicator;

means for measuring the activity of a user's input device over a time period to determine an activity rate;

means for comparing said activity rate to at least one limit selected from the group consisting of a work limit and a rest limit, if said activity rate is greater than said work limit, then adjusting said activity status indicator according to a first function, if said activity is less than said rest number, then adjusting said activity status indicator according to a second predetermined function; and

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means for signaling a warning if said activity status indicator reaches a predetermined alarm level;

said warning module comprising:

means for generating pictures, text, or sounds in response to said means for signaling.

15. A computer-readable medium for configuring a computer having a processor, memory, and input means to monitor a user's input activity on said input means, said medium comprising instructional means for:

initializing an activity status indicator;

measuring a user's activity on said input means over a predetermined duration to determine activity rate;

comparing said activity rate to at least one limit selected from the group consisting of a work limit and a rest limit, if said activity rate is greater than said work limit, then adjusting said activity status indicator according to a first function, if said activity is less than said rest limit, then adjusting said activity status indicator according to a second function; and

signaling a warning if said activity status indicator reaches a predetermined alarm level.

16. The medium of claim 15, wherein a plurality of warnings is used, each warning corresponding to a different alarm level having a particular severity.

17. The medium of claim 15, further comprising instructional means for:

delaying said warning either until said input means is idle, or after a predetermined period of time elapses.

18. The medium of claim 15, further comprising instructional means for:

measuring time between idle time of said input means and signaling a stretch warning when said time reaches a predetermined time limit.

19. The medium of claim 16, further comprising instructional means for:

generating pictures, text, or sounds using at least one warning module.

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